

What Is Claimed Is:

1. A system for driving a flat panel display having electrodes, the system comprising:

a register capable of storing a plurality of display bits each bit representing a next state for a corresponding electrode;

a latch connected to the register and having outputs, each output representing a current state for a corresponding electrode;

logic circuits corresponding to the electrodes, each logic circuit generating a plurality of control signals based on the next state and the current state of the corresponding electrode; and

driver circuitry including a change up driver and a change down driver, each electrode being selectively connectable to the driver circuitry by the corresponding logic circuit control signals,

wherein the logic circuits are configured such that the logic circuit control signals substantially simultaneously connect the change up driver to electrodes having a low current state and a high next state and the change down driver to electrodes having a high current state and a low next state.

2. The system of claim 1 wherein the electrodes are data electrodes,

3. The system of claim 1 wherein the electrodes are scan electrodes.

4. The system of claim 1 wherein each logic circuit further comprises:

a first input connected to the corresponding register bit;

a second input connected to the corresponding latch output; and

a combinational logic network receiving the first and second inputs and generating the plurality of control signals, the plurality of control signals including a change up control signal for selectively connecting the change up driver to the corresponding electrode, and a change down control signal for selectively connecting the change down driver to the corresponding electrode,

wherein the combinational logic network is configured such that the change up control signal is asserted when the corresponding electrode has a low current state and a high next state, and the change down control signal is asserted when the corresponding electrode has a high current state and a low next state.

5. The system of claim 4 further comprising:

a hold up voltage source; and

a hold down voltage source,

wherein the plurality of control signals further include a hold up control signal for selectively connecting the hold up voltage source to the corresponding electrode having a high current state and a high next state, and a hold down control signal for selectively connecting the hold down voltage source to the corresponding electrode having a low current state and a low next state.

6. The system of claim 5 wherein the logic circuits are configured such that the logic circuit control signals substantially simultaneously connect the change up driver to electrodes having a low current state and a high next state, the change down driver to electrodes having a high current state and a low next state, the hold up voltage source to electrodes having a high current state and a high next state, and the hold down voltage source to electrodes having a low current state and a low next state.

7. The system of claim 1 further comprising:
a plurality of change up switch elements, each change up switch element having an input connected to the change up control signal of a corresponding logic circuit, a first terminal connected to the change up driver, and a second terminal connected to the corresponding electrode; and

a plurality of change down switch elements, each change down switch element having an input connected to the change down control signal of a corresponding logic circuit, a first terminal connected to the change down driver, and a second terminal connected to the corresponding electrode.

8. The system of claim 7 further comprising:

a plurality of first diodes connecting the change up switch element first terminals to the change up driver, each first diode having a cathode connected to a corresponding change up switch element first terminal and an anode connected to the change up driver to prevent current from leaking into the change up driver; and

a plurality of second diodes connecting the change down switch element first terminals to the change down driver, each second diode having an anode connected to a corresponding change down switch element first terminal and a cathode connected to the change down driver to prevent current from leaking from the change down driver.

9. The system of claim 7 wherein the driver circuitry further comprises:

a first inductor having a first end connected to a power source, and a second end connected to each change up switch element first terminal; and

a second inductor having a first end connected to a power source, and a second end connected to each change down switch element first terminal.

10. The system of claim 7 wherein the driver circuitry further comprises:

an oscillator circuit having a first sinusoidal output connected to each change up switch element first terminal, and a second sinusoidal output connected to each change down switch element first terminal, wherein the oscillator circuit is configured such that signals at the first and second sinusoidal outputs are about 180 degrees out of phase with each other.

11. A flat panel display having a group of electrodes and a display driver circuit, the display driver circuit comprising:

a register capable of storing display bits, each bit representing a next state for a corresponding electrode;

a latch connected to the register and having outputs, each output representing a current state for a corresponding electrode;

logic circuits corresponding to the electrodes, each logic circuit generating a plurality of control signals based on the next state and the current state of the corresponding electrode, the control signals including a change up control signal for selectively connecting the corresponding electrode to a change up driver, and a change down control signal for selectively connecting the corresponding electrode to a change down driver;

a plurality of change up switch elements, each change up switch element having an input connected to a corresponding logic circuit for receiving the change up control signal, a first terminal connected to the change up driver, and a second terminal connected to the corresponding electrode; and

a plurality of change down switch elements, each change down switch element having an input connected to a corresponding logic circuit for receiving the change down control signal, a first terminal connected to the change down driver, and a second terminal connected to the corresponding electrode, wherein substantially simultaneously the change up control signal is asserted when the corresponding electrode has a low current state and a high next state, and the change down control signal is asserted when the corresponding electrode has a high current state and a low next state.

12. The plasma display of claim 11 wherein the group of electrodes are data electrodes.

13. The plasma display of claim 11 wherein the group of electrodes are scan electrodes.

14. The plasma display of claim 11 further comprising:

a plurality of first diodes connecting the change up switch element first terminals to the change up driver, each first diode having a cathode connected to a corresponding change up switch element first terminal and an anode connected to the change up driver to prevent current from leaking into the change up driver; and

a plurality of second diodes connecting the change down switch element first terminals to the change down driver, each second diode having an anode connected to a corresponding change down switch element first terminal and a cathode connected to the change down driver to prevent current from leaking from the change down driver.

15. A plasma display panel including a pair of substrates positioned to define a gap region therebetween, and electrodes disposed in the gap region to form display lines composed of pixels, the plasma display panel further comprising:

a register capable of storing a plurality of display bits, each bit representing a next state for a corresponding electrode;

a latch connected to the register and having outputs, each output representing a current state for a corresponding electrode;

logic circuits corresponding to the electrodes, each logic circuit generating a plurality of control signals based on the next state and the current state of the corresponding electrode; and

driver circuitry including a change up driver and a change down driver, each electrode being selectively connectable to the driver circuitry by the corresponding logic circuit control signals,

wherein the logic circuits are configured such that the logic circuit control signals substantially simultaneously connect the change up driver to electrodes having a low current state and a high next state and the change down driver to electrodes having a high current state and a low next state.

16. The plasma display panel of claim 15 wherein the electrodes are data electrodes.

17. The plasma display panel of claim 15 wherein the electrodes are scan electrodes.

18. The plasma display panel of claim 15 wherein each logic circuit further comprises:

a first input connected to the corresponding register bit;

a second input connected to the corresponding latch output; and

a combinational logic network receiving the first and second inputs and generating the plurality of control signals, the plurality of control signals including a change up control signal for selectively connecting the change up driver to the corresponding electrode, and a change down control signal for selectively connecting the change down driver to the corresponding electrode,

wherein the combinational logic network is configured such that the change up control signal is asserted when the corresponding electrode has a low current state and a high next state, and the change down control signal is asserted when the corresponding electrode has a high current state and a low next state.

19. The plasma display panel of claim 18 further comprising:

a hold up voltage source; and

a hold down voltage source,

wherein the plurality of control signals further include a hold up control signal for selectively connecting the hold up voltage source to the corresponding electrode, and a hold down control signal for selectively connecting the hold down voltage source to the corresponding electrode.

20. The plasma display panel of claim 18 further comprising:

5 a plurality of change up switch elements, each change up switch element having an input connected to the change up control signal of a corresponding logic circuit, a first terminal connected to the change up driver, and a second terminal connected to the corresponding electrode; and

10 a plurality of change down switch elements, each change down switch element having an input connected to the change down control signal of a corresponding logic circuit, a first terminal connected to the change down driver, and a second terminal connected to the corresponding electrode.

21. The plasma display panel of claim 20 further comprising:

20 a plurality of first diodes connecting the change up switch element first terminals to the change up driver, each first diode having a cathode connected to a corresponding change up switch element first terminal and an anode connected to the change up driver to prevent current from leaking into the change up driver; and

25 a plurality of second diodes connecting the change down switch element first terminals to the change down driver, each second diode having an anode connected to a corresponding change down switch element first terminal and a cathode connected to the change down driver to prevent current from leaking from the change down driver.

22. The plasma display panel of claim 20 wherein the driver circuitry further comprises:

a first inductor having a first end connected to a power source, and a second end connected to each change up switch element first terminal; and

a second inductor having a first end connected to a power source, and a second end connected to each change down switch element first terminal.

23. The plasma display panel of claim 20 wherein the driver circuitry further comprises:

an oscillator circuit having a first sinusoidal output connected to each change up switch element first terminal, and a second sinusoidal output connected to each change down switch element first terminal, wherein the oscillator circuit is configured such that signals at the first and second sinusoidal outputs are about 180 degrees out of phase with each other.

24. The plasma display panel of claim 20 wherein the register, the latch, the logic circuits, the plurality of change up switch elements, and the plurality of change down switch elements are formed as an integrated circuit.

25. A system for driving a flat panel display having electrodes, the system comprising:

driver circuitry including a change up driver and a change down driver; and

logic circuits generating control signals for substantially simultaneously connecting the change up driver to corresponding electrodes having a low current state and a high next state and the change down driver to corresponding electrodes having a high current state and a low next state.

26. The system of claim 25 wherein the electrodes are data electrodes.

27. The system of claim 25 wherein the electrodes are scan electrodes.

28. The system of claim 25 wherein the control signals include a change up control signal for selectively connecting the change up driver to the corresponding electrodes having a low current state and a high next state, and a change down control signal for selectively connecting the change down driver to corresponding electrodes having a high current state and a low next state.

29. The system of claim 25 further including a hold up voltage source and a hold down voltage source.

30. The system of claim 29 wherein the control signals further include a hold up control signal for selectively connecting the hold up voltage source to the corresponding electrode having a high current state and a high next state, and a hold down control signal for selectively connecting the corresponding electrode having

a low current state and a low next state.

31. The system of claim 25 wherein the driver circuitry includes a change up driver including a first inductor and a change down driver including a second inductor.

32. The system of claim 31 wherein the inductance of the first inductor is variable to match the loading conditions of the corresponding electrodes.

33. The system of claim 31 wherein the inductance of the second inductor is variable to match the loading conditions of the corresponding electrodes.

34. The system of claim 25 wherein the driver circuitry includes an oscillator circuit.

35. The system of claim 34 wherein the oscillator circuit provides a first voltage waveform corresponding to the change up driver and a second voltage waveform corresponding to the change down driver.

36. The system of claim 35 wherein the first and second voltage waveforms have opposite phases.

37. The system of claim 25 wherein the driver circuitry substantially simultaneously provides a change up waveform and a change down waveform having an opposite phase from the change up waveform.

38. The system of claim 25 wherein the driver circuitry further includes a hold up driver and a hold down driver.

39. The system of claim 25 further including a ramp function generator for providing a ramp change up waveform corresponding to the change up driver and a ramp change down waveform corresponding to the change down driver.

40. The system of claim 25 wherein the driver circuitry includes only passive electrical components.

41. A plasma display panel having electrodes, the system comprising:

driver circuitry including a change up driver and a change down driver; and

logic circuits generating control signals for substantially simultaneously connecting the change up driver to data electrodes having a low current state and a high next state and the change down driver to data electrodes having a high current state and a low next state.

42. The plasma display panel of claim 41 wherein the electrodes are data electrodes.

43. The plasma display panel of claim 41 wherein the electrodes are scan electrodes.

44. The plasma display panel of claim 41 wherein the driver circuitry includes a change up driver formed by a first inductor and a change down driver formed by a second inductor.

45. The plasma display panel of claim 44 wherein the inductance of the first inductor is variable to match the loading conditions of the corresponding electrodes.

46. The plasma display panel of claim 44 wherein the inductance of the second inductor is variable to match the loading conditions of the corresponding electrodes.

47. The plasma display panel of claim 41 wherein the driver circuitry includes an oscillator circuit.

48. The plasma display panel of claim 47 wherein the oscillator circuit provides a first voltage waveform corresponding to the change up driver and a second voltage waveform corresponding to the change down driver.

49. The plasma display panel of claim 48 wherein the first and second voltage waveforms have opposite phases.

50. The plasma display panel of claim 41 wherein the driver circuitry substantially simultaneously provides a change up waveform and a change down waveform having an opposite phase from the change up waveform.

51. The plasma display panel of claim 41 wherein the driver circuitry further includes a hold up driver and a hold down driver.

52. The plasma display panel of claim 41 further including a ramp function generator for providing a ramp change up waveform corresponding to the change up driver and a ramp change down waveform corresponding to the change down driver.

53. The plasma display panel of claim 41 wherein the driver circuitry includes only passive electrical components.